U.S. Fish and Wildlife Service
Region 2
Contaminants Program

An interim Report

by

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BACKGROUND

Amphibian populations are declining in many parts of the world, in some cases to the point of extinction. Much of the decline is attributed to obvious habitat destruction or modification, but where data are available, factors such as acid precipitation, pesticide contamination, agricultural practices and land-use changes are suspected as being important in bringing about population changes. Although organisms other than amphibians may be affected by the same factors,

amphibians are particularly sensitive bioindicators because of their permeable skins, biphasic life history and pattern of embryonic development.

The problem of declining amphibian populations is particularly severe in western United States where pollutants are suspected of causing declines in two of five frog species in the Sierra Nevada Mountains alone. In Arizona, the Tarahumara frog Lana tarabumarae), a federal candidate (Category 1) for listing, has been extirpated and populations of four other leopard frog species are diminishing. The populations began to decline in the late 1970s and early 1980s, with an abrupt crash over a 1-year period.

The causes of population declines have not been identified, although trace element contamination and acid precipitation are suspected by most experts. Acid rain, perhaps resulting from smelter emissions in Arizona and Sonora, and physical erosion of soils apparently mobilize trace elements into canyon streams. Sulphur dioxide emissions from copper smelters are greatest in areas where frog numbers have severely declined. The Tarahumara frog spends more time in the water than other ranids, another indication that dissolved chemicals may be a problem. Some species, such as the Tarahumara and other Arizona leopard frogs, have evolved in low Ph environments and have not experienced increased acidity in their evolutionary history and so are especially sensitive to lowered phi. Also, the toxicity of metals such as aluminum, copper, iron, and zinc is enhanced by higher acidity.

OBJECTIVES

1) Assess current distribution of leopard frog populations inhabiting National Wildlife Refuges in Arizona and evaluate current distribution with historic demographic data. 2) Compare contaminant levels in areas where leopard frog populations are declining with levels in areas where frog populations are stable. 3) Assess contaminant levels at the three most probable Tarahumara frog reintroduction sites.

RESULTS

No native leopard frogs were located on National Wildlife Refuge (NWR) lands. Bullfrogs Danaatesbeiana) were collected from Cibola, Imperial, Buenos Aires, and San Bernardino NWRs. Although bullfrogs were present on Havasu NWR,

we were unable to collect a sample. We were unable to locate bullfrogs on Bill Williams, Kofa, and Cabeza Prieta NWRs. Tadpoles, (species unconfirmed but probably toads) were collected on Bill Williams and Cabeza Prieta NWRs. Sediment was collected from Havasu, Bill Williams, and Kofa NWRs.

Three potential Tarahumara frog reintroduction sites selected for sampling were based on recommendations of the Tarahumara Frog Recovery Oversight Group. These included Sycamore Canyon in the Pajaritos Mountains, Gardner/Sawmill Canyons and Big Casa Blanca Canyons in the Santa Rita Mountains. One leopard frog, possibly the Chiricahua leopard frog Dana chiricabuensis), was observed in Sycamore Canyon. We collected water, invertebrates and fish, (Sonora chub Gila diteenia), from Sycamore Canyon. No frogs were observed in Gardner/Sawmill or Big Casa Blanca Canyons. We collected water and aquatic invertebrates from Gardner/Sawmill Canyons and water, aquatic invertebrates, and fish (longfin daceAgosia chrysigaster) from Big Casa Blanca Canyon.

Sample analysis is ongoing. A final report will be prepared within 180 days of receipt of the final residue analysis results.